

WHAT IS CLAIMED IS:

1. An optical projection system, comprising:

a light source, to provide a parallel light beam;

5 a first color splitter, to split the parallel light beam into a first primary color beam and a color mixing beam, wherein the color mixing beam includes a second primary color beam and a third primary color beam;

a first both-side telecentric group, implemented after the first color splitter and on a first light path of the first primary color beam, so as to produce a first light beam;

10 a second both-side telecentric group, implemented after the first color splitter and on a second light path of the color mixing beam;

a second color splitter, disposed at a position, so as to split the color mixing beam into a second light beam and a third light beam; and

a mixing and projection unit, receiving the first light beam, the second light beam, and the third light beam to combine and project.

15 2. The system of claim 1, wherein each of the first and the second both-side telecentric groups includes at least one reflection mirror to adjust a light path direction.

3. The system of claim 1, wherein the light beams have equal path length.

4. The system of claim 1, wherein the mixing and projection unit includes:

20 three liquid crystal panel set disposed with respect to the light beams, a projection lens set, a color-combination prism to mix the light beams into a mixed beam and then lead the mixed beam to the projection lens set, at least one reflection mirror to lead at least one of the second light beam and the third light beam onto the color-combination prism.

5. The system of claim 1, wherein the mixing and projection unit includes:

a color-combination prism including four surfaces, a projection lens set disposed with respect to one of the four surfaces of the color-combination prism, three liquid crystal reflection panels disposed with respect to the other three of the four surfaces of the color-combination prism, and three wire grid polarizers (WGPs) grouping with the three liquid crystal reflection panels, so as to cause the light beams to enter the color-combination prism.

6. The system of claim 5, wherein the three liquid crystal reflection panels are respectively parallel to the three surfaces of the color-combination prism.

7. The system of claim 5, wherein the mixing and projection unit further includes three polarizers, disposed before the three WGPs.

8. The system of claim 1, wherein the first and second color splitters include using the film without gradient coating therein.

9. An optical projection method, comprising:

providing a parallel light beam;

splitting the parallel light beam into a first light beam and a color mixing beam;

leading the first light beam to enter a first both-side telecentric group;

leading the color mixing beam to enter a second both-side telecentric group;

splitting the color mixing beam into a second light beam and a third light beam;

combining the first light beam, the second light beam and the third light beam,

so as to form a mixed light beam; and

projecting the mixed light beam.

10. The method of claim 9, wherein the step of mixing the first light beam, the second light beam and the third light beam includes using a plurality of liquid crystal panels to produce an image pattern.

11. The method of claim 9, wherein the step of mixing the first light beam, the second light beam and the third light beam includes using a plurality of liquid crystal on silicon (LCOS) panels to produce an image pattern.

5 12. The method of claim 11, further using a plurality of wire grid polarizers (WGPs) with the LCOS panels to produce the image pattern.

13. The method of claim 9, wherein the step of combining the first light beam, the second light beam and the third light beam includes using a color-combination prism.

10 14. The method of claim 9, wherein the step of splitting the parallel light beam into the first light beam and the color mixing beam includes using a color splitter without gradient coating film therein.

15 15. The method of claim 9, wherein the step of splitting the color mixing beam into the second light beam and the third light beam includes using a color splitter without gradient coating film therein.